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STATUS OF 1971 COLD-INJURED TREES

Sandia Ranger District
Cibola National Forest
New Mexico

1973

Branch of Forest Insect and Disease Management
Division of Timber Management
Southwestern Region, USDA, Forest Service
517 Gold Avenue, SW
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From January 4 to 8, 1971, temperatures on the Sandia Ranger District, near Albuquerque, New Mexico, were extremely low. Maximum and minimum temperatures recorded at the Sandia Ranger Station (Fig. 1) during the period of cold weather are shown in Table 1. By March 1971, the foliage of pinyon pine trees (Pinus edulis) in several drainage bottoms was reddish-brown (Fig. 2, 3, and 4). Ponderosa pine trees (Pinus ponderosa var. scopulorum) were also injured in a few areas.

In order to evaluate the injury, five permanent plots were established in June 1971 (Fig. 1). Plots 1-4 were established in pinyon stands, and plot 5 was established in a ponderosa stand. Plots 1, 4, and 5 were in bottoms, plot 2 was on a southeast-facing slope, and plot 3 extended from a bottom up a southeast-facing slope (Fig. 5). Trees on the plots were tagged. The extent of defoliation in each tagged tree was estimated. Four defoliation classes were used: 1 = 0-25%; 2 = 26-50%; 3 = 51-75%; 4 = 76-100% defoliation. Defoliation was greatest on plot 1 and least on plot 2 (Table 2).

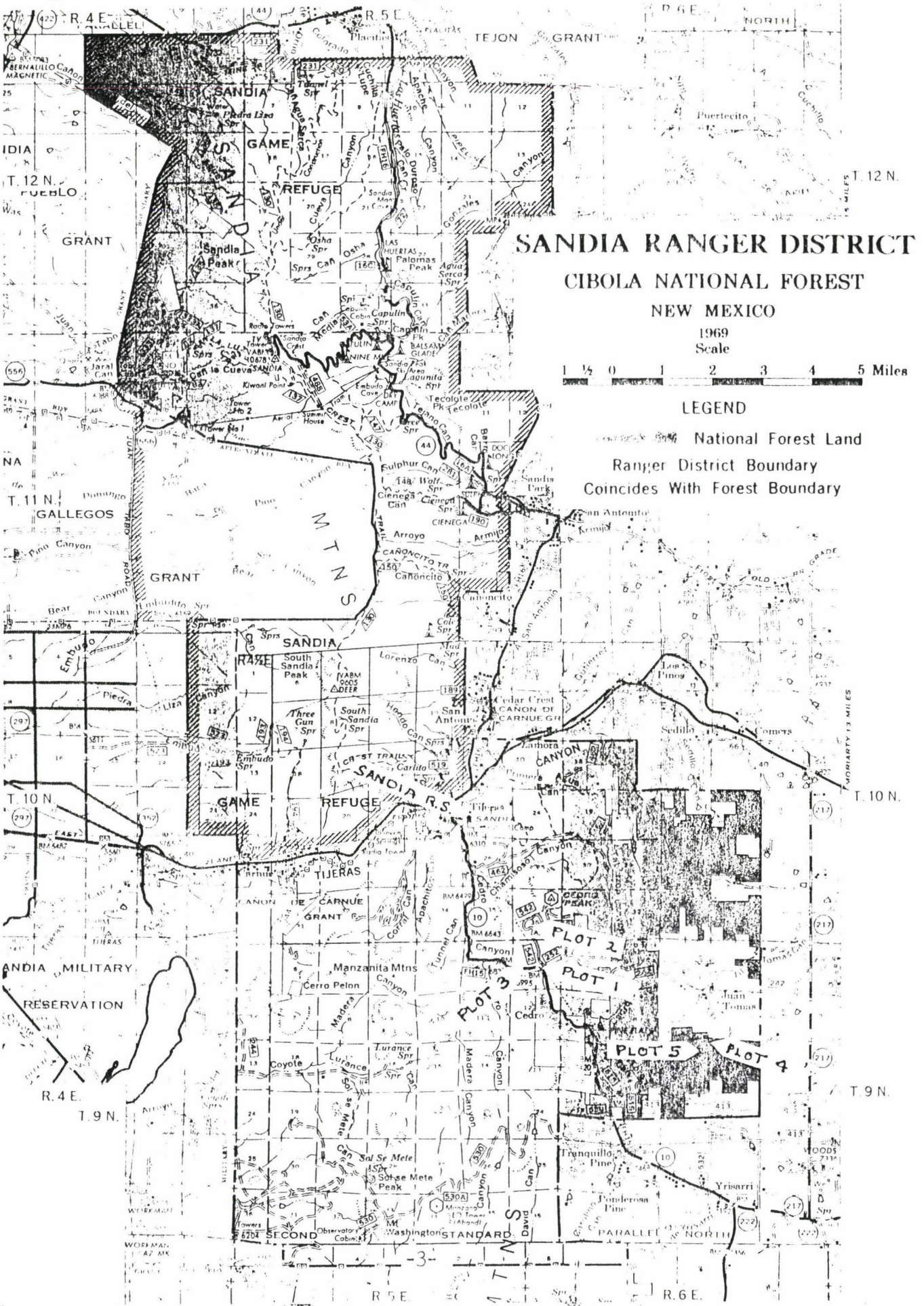
The plots were examined 4 months later on September 15, 1971. All of the trees were alive, but several of the pinyon pines were in poor condition (Fig. 6).

The plots were examined again in October and November 1972. By that time, branch mortality had occurred in many of the trees. The extent of branch mortality in each tree was estimated. Four branch mortality classes were used: 1 = 0-25%; 2 = 26-50%; 3 = 51-75%; 4 = 76-100% branch mortality. Some trees that were severely defoliated in 1971 had suffered severe branch mortality (Table 3). Four trees that were in defoliation class 4 in June 1971 had died. The exact cause of their death could not be determined. Two of the dead trees contained secondary insects.

Plot 1 was checked on March 27, 1973, and photographs were taken (Fig. 7, 8, and 9). The trees on the plot appeared to be in about the same condition as in October and November 1972.

Personnel in the Branch of Forest Insect and Disease Management will plan to examine the plots annually for at least two more years.

Fig. 1.--Evaluation of 1971 cold injury.



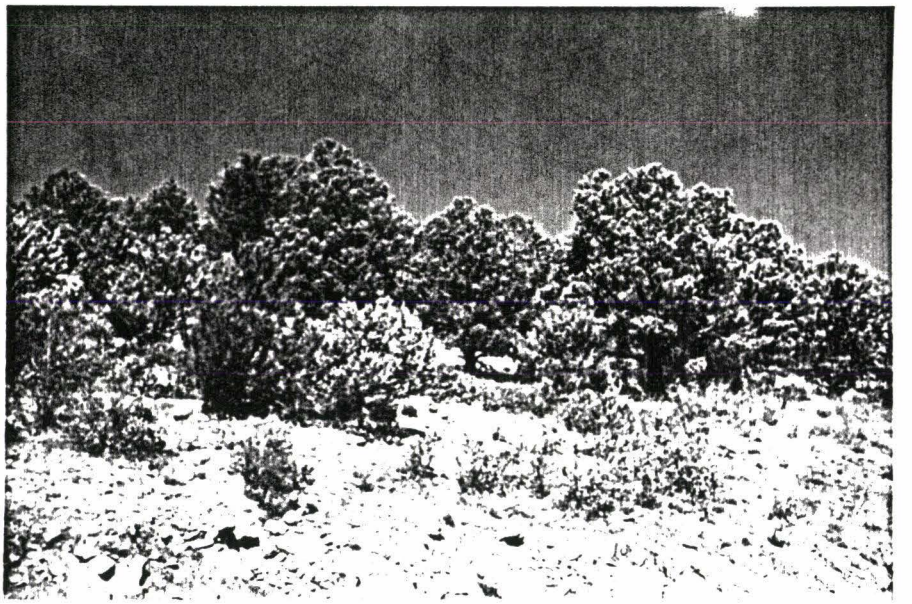


Fig. 2.--Cold-injured pinyon pine stand, Sandia Ranger District, March 1971.

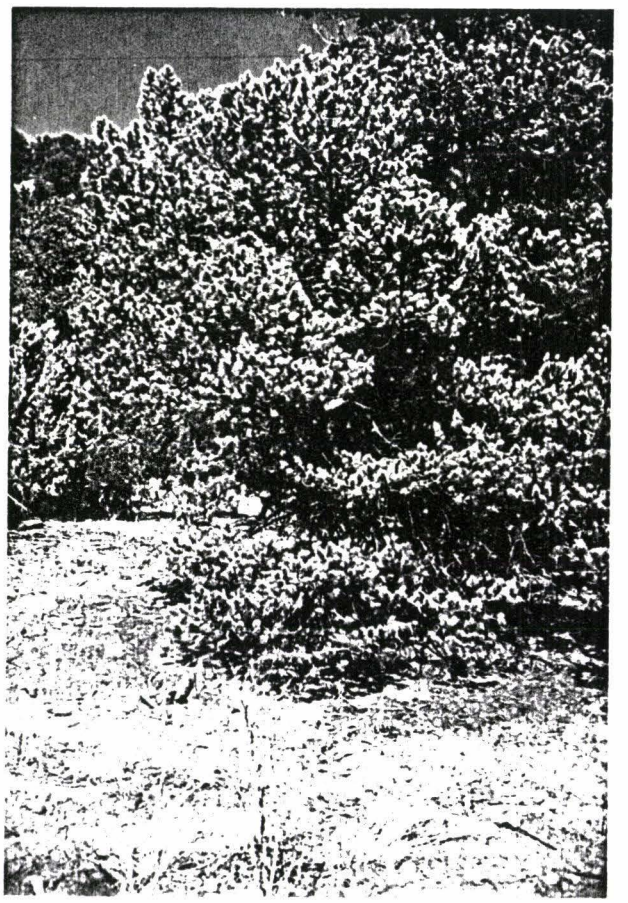


Fig. 3.--Cold-injured pinyon pine with typical discolored foliage, March 1971.

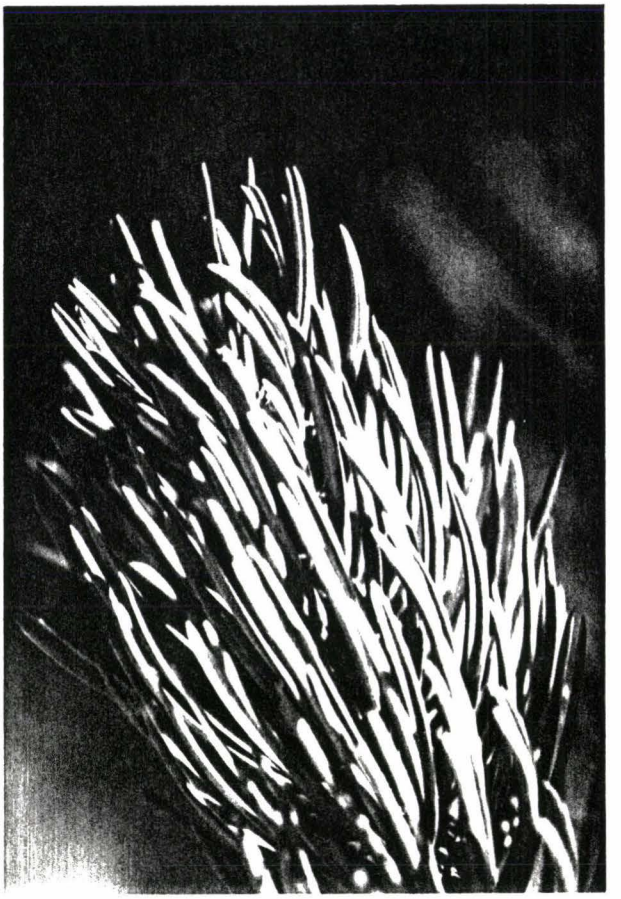


Fig. 4.--Discolored foliage of cold-injured pinyon pine, March 1971.

Table 1.--Maximum and minimum daily temperatures (F°) recorded at the Sandia Ranger Station, Jan. 4-8, 1971[1/]

	Day of month				
	4	5	6	7	8
Maximum temperature	8	13	14	11	21
Minimum temperature	1	-28	-38	-35	-2

1/ U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service. 1971. Climatological Data: New Mexico, Vol. 75(1): 1-17.

Table 2.--Defoliation of cold-injured trees on the Sandia Ranger District, June 1971.

Plot No.[1/]	No. trees by defoliation class[2/]				Total
	1	2	3	4	
1	0	0	4	46	50
2	50	0	0	0	50
3	25	4	16	5	50
4	25	5	10	10	50
5	12	9	1	0	22

1/ Plots 1-4 contained pinyon pine; plot 5 contained ponderosa pine.
2/ 1 = 0-25%; 2 = 26-50%; 3 = 51-75%; 4 = 76-100%.

Table 3.--Branch mortality in cold-injured trees on the Sandia Ranger District, Oct. and Nov. 1972.

Plot No.[1/]	No. trees by branch mortality class[2/]				Total
	1	2	3	4	
1	4	13	16	14	47[3/]
2	50	0	0	0	50
3	30	10	9	0	49[4/]
4	37	9	2	2	50
5	16	3	1	0	20[5/]

1/ Plots 1-4 contained pinyon pine; plot 5 contained ponderosa pine.
2/ 1 = 0-25%; 2 = 26-50%; 3 = 51-75%; 4 = 76-100%.
3/ Three trees had died since June 1971.
4/ One tree had died since June 1971.
5/ Two trees were not found.

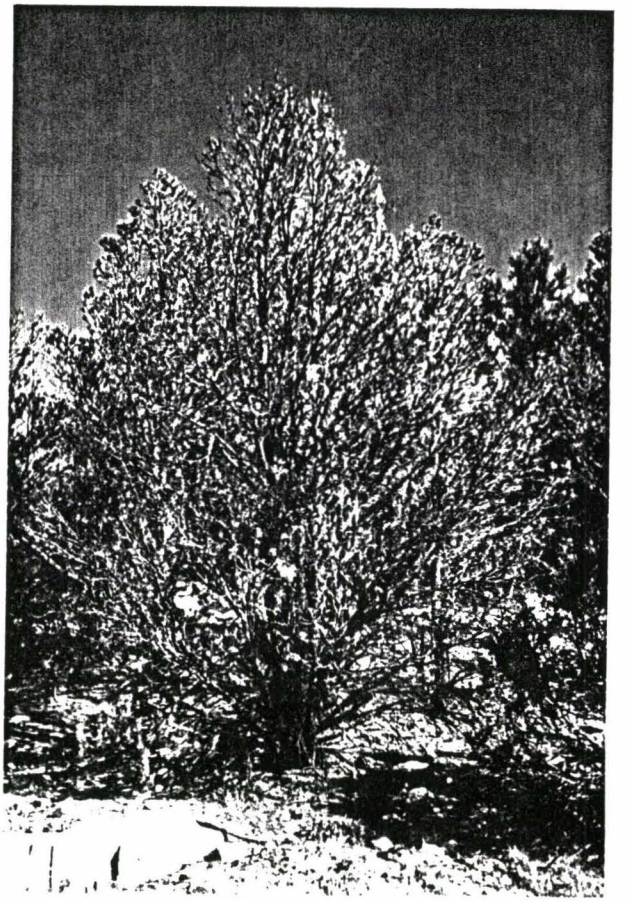


Fig. 6.--One of cold-injured pinyon pines in Sep. 1971. Tree was alive, but in poor condition (tree 101, plot 1).

Fig. 7.--Same tree as Fig. 6, Mar. 1973.
Tree is dead.

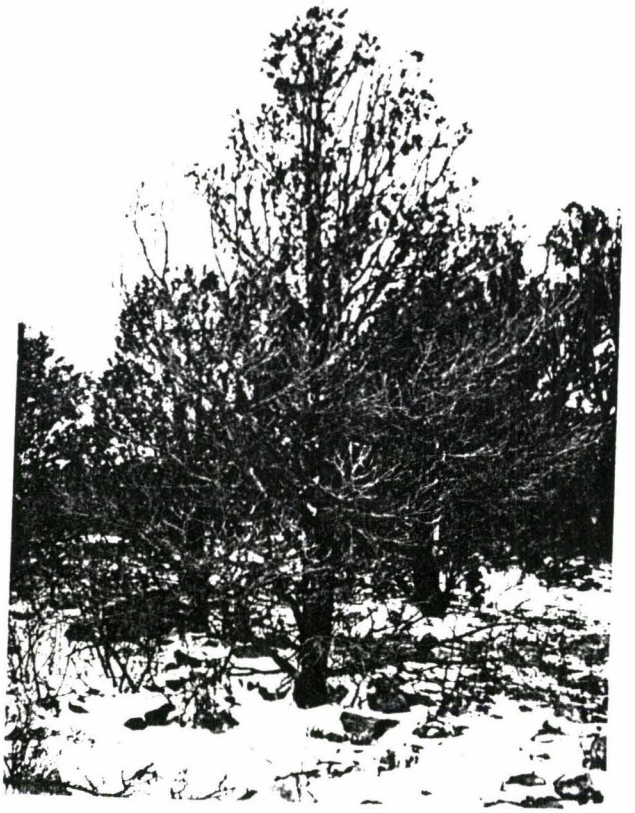


Fig. 8.--A pinyon pine in branch mortality class 4, Mar. 1973 (tree 105, plot 1).

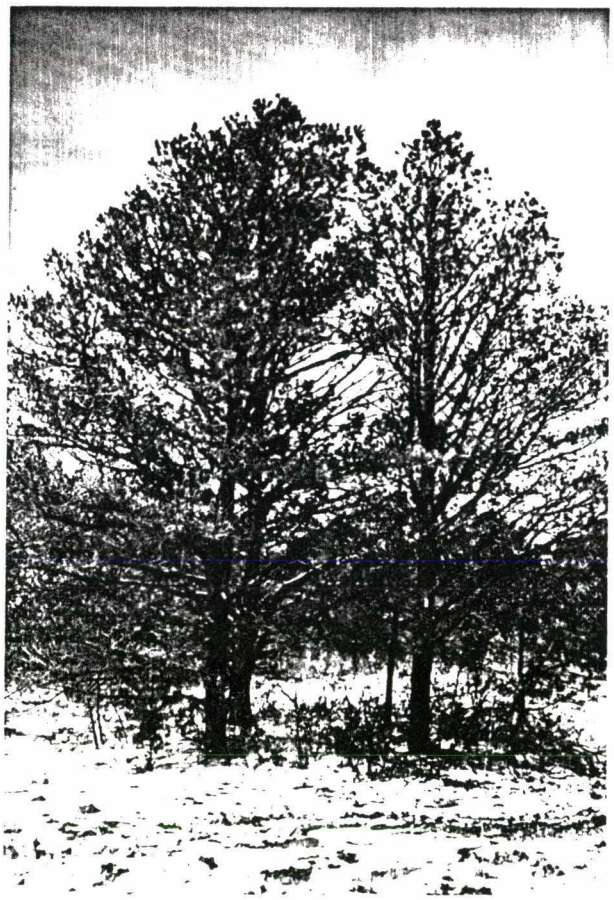


Fig. 9.--Pinyon pine trees in branch mortality class 2, Mar. 1973 (trees 138, 139, and 140 on plot 1).